



INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

## CERTIFIED COPY OF PRIORITY DOCUMENT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that by virtue of an assignment registered under the Patents Act 1977, the application is now proceeding in the name as substituted.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1985 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., p.l.c. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Dated 8 March 2002

**THIS PAGE BLANK (USPTO)**



INVESTOR IN PEOPLE

GB0102907.3

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

MULTIMATIC ADVANCED TECHNOLOGIES  
Incorporated in Barbados  
2<sup>nd</sup> Floor  
International Trading Centre  
Warrens  
St Michael  
Barbados

[ADP No. 08311144001]

THIS PAGE BLANK (USPTO)

THIS PAGE BLANK (USPTO)

**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

THE PATENT OFFICE

L

- 6 FEB 2001

NEWPORT

The Patent Office

Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

1. Your reference IHWD / P23437GB

2. Patent application number  
(The Patent Office will fill in this part)

**0102907.3**

06FEB01 E603722-12 D02866  
P01/7700 0.00-0102907.3

3. Full name, address and postcode of the or of each applicant (underline all surnames)

UPF (UK) Limited  
1111 Fields Road  
Ettlingham  
Wolverhampton  
WV4 6JF  
United Kingdom

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

SECTION 30 (1) ACT 1977  
F 6 FEB 2001  
66022 66001  
APPLICATION FILED  
17-01-02

4. Title of the invention

VEHICLE DOOR HINGE

5. Name of your agent (if you have one)

ERIC POTTER CLARKSON  
PARK VIEW HOUSE  
58 THE ROPEWALK  
NOTTINGHAM  
NG1 5DD

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Patents ADP number (if you know it)

1305010

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor; or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.  
See note (d))

## Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form

Description 5

Claims(s) 2

Abstract 0

Drawing(s) 2 *2A*

10. If you are also filing in any of the following, state how many against each item.

Priority Documents 0

Translations of priority documents 0

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) NO

Request for preliminary examination and search (*Patents Form 9/77*) YES

Request for substantive examination (*Patents Form 10/77*) NO

Any other documents  
(please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature

*Eric Potter Clarkson*  
ERIC POTTER CLARKSON

Date

5 February 2001

12. Name and daytime telephone number of person to contact in the United Kingdom

0115 9552211

### Warning

*After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.*

### Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 01645 500505.*
- Write your answers in capital letters using black ink or you may type them.*
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.*
- Once you have filled in the form you must remember to sign and date it.*
- For details of the fee and ways to pay please contact the Patent Office.*

## VEHICLE DOOR HINGE

DUPLICATE

5 The present invention relates to a vehicle door hinge, in particular but not exclusively, a vehicle door which is particularly suitable for the hanging of a vehicle rear door.

According to one aspect of the present invention there is provided a vehicle hinge assembly for hanging a vehicle door on a vehicle body, the assembly comprising a first hinge leaf hingedly connected to a second hinge leaf by a  
10 pivot pin, the pivot pin being immovably mounted in one hinge leaf and being rotatably mounted in, and being axially withdrawable from, the other hinge leaf, and hinge pin retention means associated with said other hinge leaf for preventing axial withdrawal of the hinge pin therefrom, the hinge pin retention means having hinge pin engagement means which engage with  
15 the hinge pin to permit rotation of the hinge pin but prevent its axial withdrawal from said other hinge leaf.

According to another aspect of the present invention there is provided a vehicle hinge assembly for hanging a vehicle door on a vehicle body, the  
20 assembly comprising a first hinge leaf hingedly connected to a second hinge leaf by a pivot pin, each hinge leaf comprising a body cast from a metal to define a shell including a boss having a bore in which the hinge pin is located

25 Various aspects of the present invention are hereinafter described with reference to the accompanying drawings, in which :-

Figure 1 is a front view of a hinge according to one embodiment of the present invention

Figure 2 is a rear view of the hinge shown in Figure 1

30 Figure 3 is a sectional view taken along line III-III in Figure 1

Figure 4 is a sectional view taken along line IV-IV in Figure 1

Figure 5 is a sectional view taken along line V-V in Figure 1

Figure 6 is a sectional view taken along line VI-VI in Figure 1

Figure 7 is a plan view of the hinge shown in Figure 1

5 Figure 8 is a rear perspective view of the hinge shown in Figure 1

Referring initially to Figure 1 there is shown a vehicle door hinge assembly 10 having a door hinge leaf 12 hingedly connected to a body hinge leaf 14 via a pivot shaft or pin 15.

10 In use, the hinge leaf 12 is connected to a vehicle door ( not shown ) and the hinge leaf 14 is connected to the vehicle body ( not shown ).

Preferably each leaf 12,14 is defined by a cast body which is cast from a  
15 suitable metal, preferably a metal such as SG cast iron. Preferably, as more clearly seen in Figure 8, the body is cast to define for each hinge leaf a generally hollow shell predominantly comprising a shell wall 11 having a relatively thin wall thickness, for example a thickness of about 4 mm. The thickness is chosen to provide each shell with the required strength.

20 Preferably the hinge pin 15 is fixedly secured in a blind bore 30 formed in a boss 29 cast integrally with wall 11 of hinge leaf 14 and is rotatably received in a blind bore 32 formed in a boss 28 cast integrally with wall 11 of hinge leaf 12. A bearing bush 128 is preferably located within the blind  
25 bore 32 to provide rotary support for the hinge pin 15.

Bosses 28,29 are of greater thickness than wall 11 in order to accommodate the hinge pin 15.



The hinge pin 15 is axially withdrawable from the blind bore 32 to enable the hinge leafs to be separated.

5 Preferably hinge pin retention means are provided for axially retaining the hinge pin 15 within the bore 32. Preferably the hinge pin retaining means 35 include a ball catch assembly 37 having a ball bearing 38 resiliently biased by a spring (not shown) into contact with an annular groove 40 extending about the hinge pin 15.

10 The ball 38 is preferably rotatably located in an end of a housing 39 which is preferably screw threadedly located within a bore 44 formed within a wall projection 42 on boss 28 of hinge leaf 12 and may be axially moved along bore 44 to/from the hinge pin 15 by a screwing action.

15 The ball 38 preferably has a diameter greater than the depth of the groove 40 such that when housing 39 is axially positioned within bore 44 with the ball 38 fully seated in the groove 40, axial withdrawal of the hinge pin 15. Location of the ball 38 within groove 40 does not impede rotation of the hinge pin 15 due to the capability of the ball 38 to rotate. It is however  
20 envisaged that a non rotating ball 38 may be provided in which case there would be sliding contact between the ball 38 and groove 40, a suitable lubricant being preferably provided to reduce sliding friction therebetween.

In order to enable the hinge pin 15 to be axially withdrawn, it is first  
25 necessary to axially withdraw housing 39 to move the ball 38 out of registry with the groove 40.

Access to the assembly 37 for screwing it along bore 44 is gained via the open end of the bore 44. Preferably, as shown in Figure 4, when the hinge is  
30 in its door closed position, the wall projection 42 is located within a recess

48 formed in hinge leaf 14 and so access to the open end of the bore 44 is prevented. Accordingly it is not possible to gain access to the assembly 37 whilst the door is closed and so unauthorised personnel are prevented from tampering with the assembly 37. Also whilst the wall projection 42 is located within recess 38 the hinge leafs 12,14 are interleaved and cannot be axially separated.

Hinge leaf 12 is preferably provided with a stop formation 50 which is engageable against the front face of the hinge leaf 14 so as to define a fully open position as shown in broken lines in Figure 6. In the fully open position, the wall projection 42 is clear of the recess 48 and so permits the hinge leafs 12,14 to be moved axially apart after overcoming the resistance imposed by the ball catch assembly 37.

Preferably both bores 30,32 are blind in order to prevent unauthorised access to the hinge pin and to prevent ingress of water/dirt and to visually conceal the location of the hinge pin 15 when viewing the hinge assembly when mounted on a vehicle. Preventing unauthorised access to the hinge pin 15 is particularly advantageous as a security feature which makes it difficult for the hinge assembly to be dismantled by unauthorised personnel. If desired, however bore 30 and/or bore 32 may be open ended.

Preferably connection of both the hinge leafs 12,14 to the vehicle door and body is achieved by providing each hinge leaf with a pair of laterally projecting studs 18. Preferably the studs 18 are externally screw threaded to be capable of receiving a screw threaded nut.

Preferably the hinge leafs 12,14 are each provided with internally screw threaded blind bores 19 formed in bosses 19a which are integrally cast with

the wall 11 of each hinge leaf 12,14. An end of each stud 18 is screw threadedly received within a respective bore 19.

As more clearly seen in Figures 3, 4 and 7, the terminal faces of walls 11 of each leaf 12,14 define a generally planar abutment face 22 from which studs 18 project. In use, the abutment face 22 of each leaf 12,14 will abut against a support face (not shown) of the vehicle door and body respectively. As seen in Figures 4 and 7, the abutment faces 22 of each hinge leaf 12,14 are co-planar when the hinge leafs are angularly located at the door close position.

As seen in Figure 3, the axis of the hinge pin 15 is inclined relative to the plane containing abutment faces 22 and so enables the hinge assembly to be mounted on inclined support faces of the vehicle body whilst ensuring that the hinge pin 15 extends in a desired direction. This is particularly advantageous when wishing to align two opposed hinge assemblies on the support surface with their hinge pins coaxial. It will be appreciated that the amount of angular inclination of the hinge pin relative to the abutment face 22 may be varied as desired during manufacture of the hinge assembly.

It will be appreciated that the hinge of the preferred embodiment is relatively light in weight despite being cast from a relatively heavy metal such as cast iron. This is primarily due to constructing the hinge leafs in the form of thin walled shells.

## CLAIMS

1. A vehicle hinge assembly for hanging a vehicle door on a vehicle body, the assembly comprising a first hinge leaf hingedly connected to a second hinge leaf by a pivot pin, the pivot pin being immovably mounted in one hinge leaf and being rotatably mounted in, and being axially withdrawable from, the other hinge leaf, and hinge pin retention means associated with said other hinge leaf for preventing axial withdrawal of the hinge pin therefrom, the hinge pin retention means having hinge pin engagement means which engage with the hinge pin to permit rotation of the hinge pin but prevent its axial withdrawal from said other hinge leaf.
2. A hinge assembly according to Claim 1 wherein the hinge pin is provided with an annular groove which co-operates with said hinge pin engagement means to permit rotation of the hinge pin whilst preventing its axial withdrawal.
3. A hinge assembly according to Claim 1 or 2 wherein said hinge pin engagement means is a ball bearing.
4. A hinge assembly according to Claim 3 wherein each hinge leaf comprises a body cast from a metal to define a shell including a boss having a bore in which the hinge pin is located.
5. A hinge assembly according to Claim 4 wherein said ball bearing is housed in a housing, the housing being axially movably located in a bore formed in the boss of said other hinge leaf.
6. A hinge assembly according to Claim 5 wherein the bore housing said ball bearing housing is formed in a wall projection integrally cast with

said boss of said other hinge leaf, said wall projection being interleaved with said one hinge leaf over a predetermined angular range of movement about said hinge pin in order to prevent axial separation of the hinge leaves.

5 7. A hinge assembly substantially as herein described with reference to and as illustrated in the accompanying drawings.

8. A vehicle hinge assembly for hanging a vehicle door on a vehicle body, the assembly comprising a first hinge leaf hingedly connected to a  
10 second hinge leaf by a pivot pin, each hinge leaf comprising a body cast from a metal to define a shell including a boss having a bore in which the hinge pin is located.

**THIS PAGE BLANK (USPTO)**

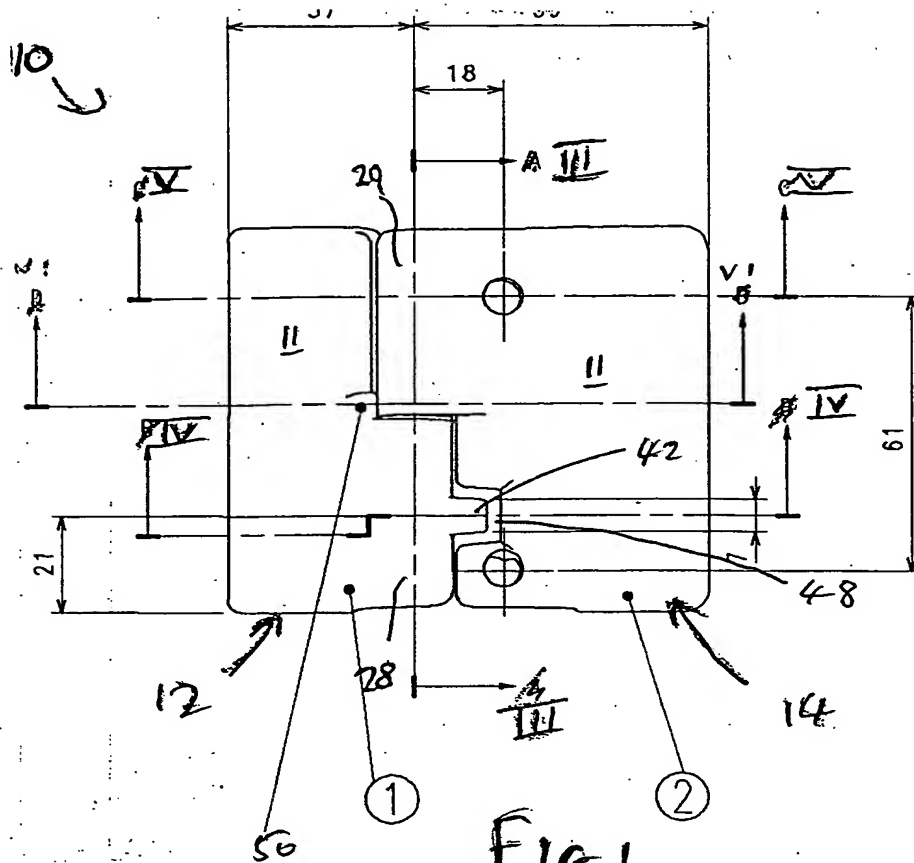


FIG 1

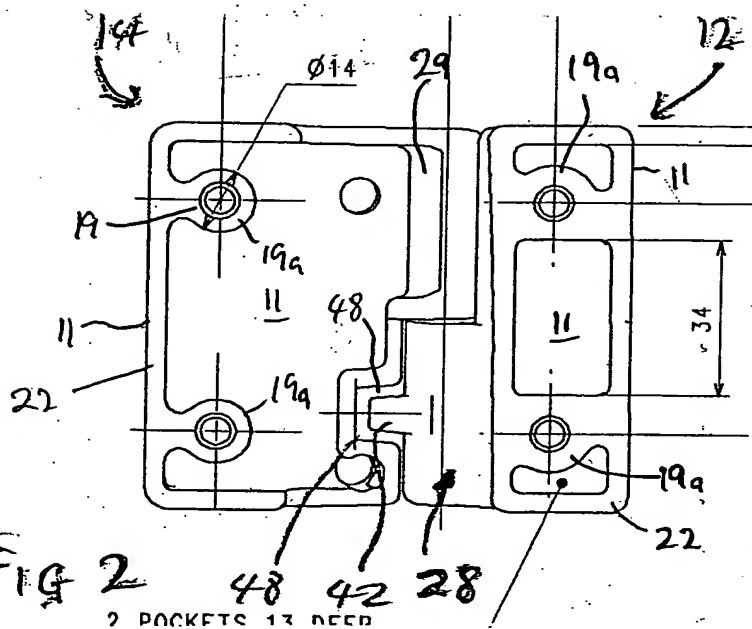


FIG 2

2 POCKETS 13 DEEP

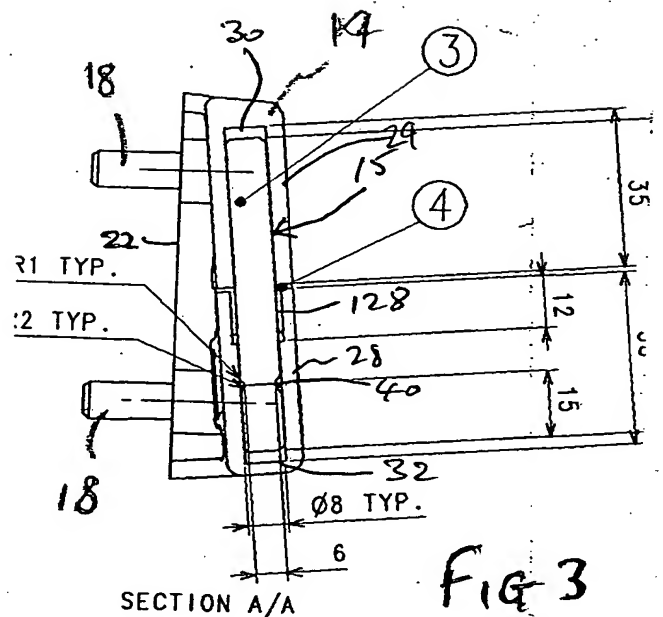


FIG 3

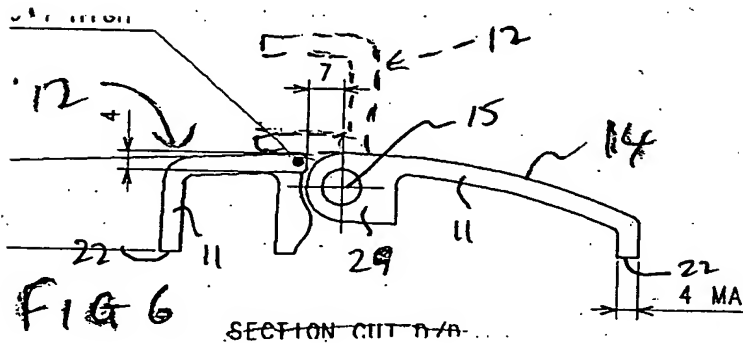
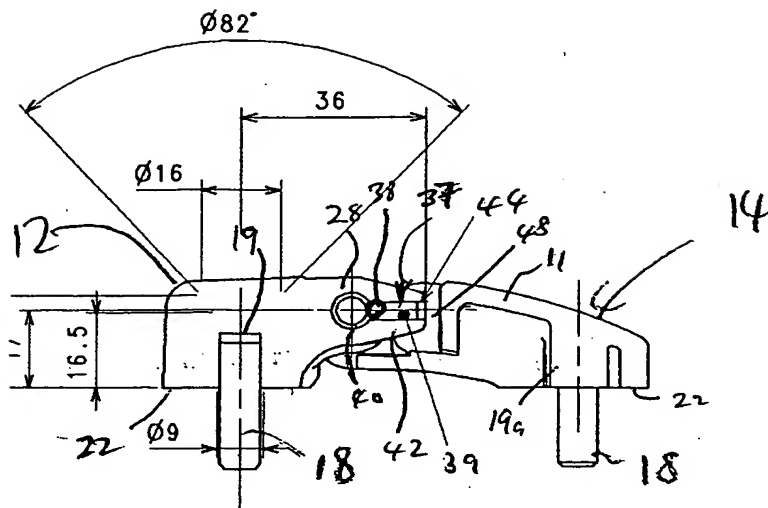


FIG 6

SECTION C/C

THIS PAGE BLANK (USPTO)





SECTION B/B

FIG 4

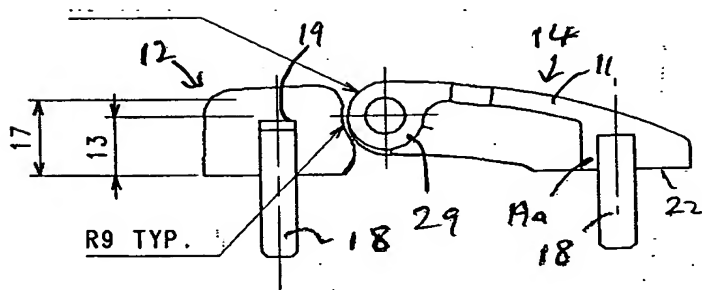


FIG 5

SECTION C/C

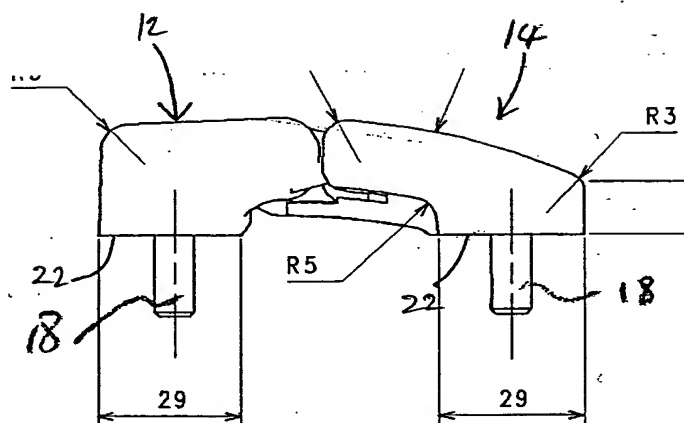


FIG 7

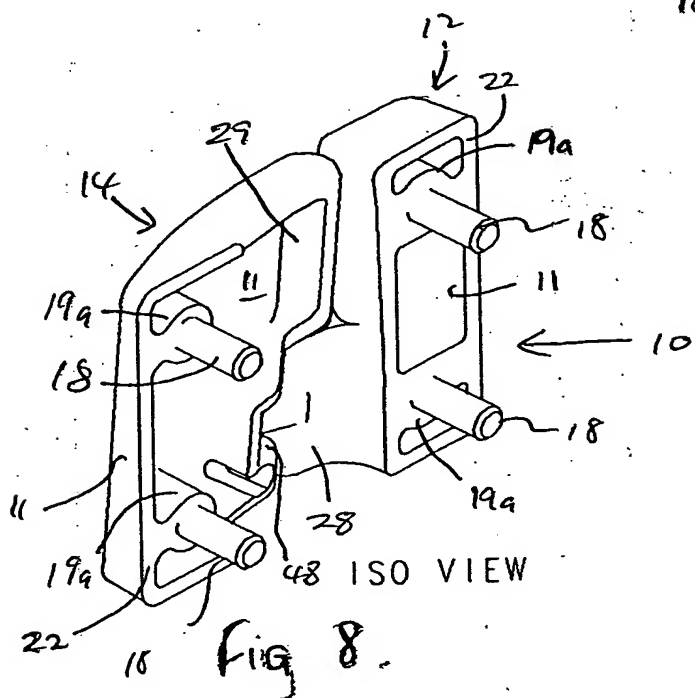


FIG 8

UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	Serial No.	Filed

**THIS PAGE BLANK (USPTO)**